



INSIGHT LIME

NEWSLETTER OF MAERZ OFENBAU AG

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Scotti

NO PROBLEM.

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Maerz lime kilns are extremely efficient in every environment. They also operate unmanned. Is it a bit lonely where you are? No problem: maerz.com



REMOTE CONTROL

Industry 4.0 also has a significant impact on the lime industry. Although requirements may not be as extreme as insinuated in our cover photo, every lime plant will benefit from the new data mining and processing possibilities. We at Maerz believe, however, that the basis for a successful lime plant is still the lime kiln. Data processing may only assist and optimise kiln operation and overall performance. We expressed this view in a presentation we gave last fall at the International Lime Association's Information Exchange Forum in Cape Town, which has been reprinted in this issue.

We would also like to introduce a very specific kiln to you, which Maerz built for Schaefer Kalk in Malaysia: this kiln is designed to operate at extremely high temperatures in order to produce a hard burnt lime to be used in very specific products of Schaefer Kalk.

And of course we present a selection of our most recent orders to keep you updated on the worldwide lime industry. We are proud that Maerz has been awarded the largest order in its history regarding kiln capacities: 5 × 800 tonnes per day kilns for Tangshan Gangyuan Metallurgical and Furnace Co., in their Laoting Plant in Hebei province, P.R. China, which is currently under construction and will be commissioned at the end of this year.

Enjoy reading this edition of Insight Lime!

Stephan Lechner



SCHAEFER KALK MALAYSIA - THE HOTTEST LIME KILN EVER BUILT BY MAERZ!

Schaefer Kalk GmbH & Co. KG, the renowned German lime manufacturer, has been operating a major lime plant in Kuala Ketil, a small town in North Malaysia's Kedah province since 1997. As is typical for Schaefer Kalk lime plants, the limestone quality coming from their quarries is exceptional. Only with such high grade raw materials is Schaefer Kalk in a position to serve its demanding customers with specialty products.

In 2013 Schaefer Kalk approached Maerz with a very specific request: would it be possible to produce hard burnt lime from its high grade limestone in Malaysia? When testing the limestone, it became clear at an early stage of the project that only very high burning temperatures would lead to the desired quicklime reactivity. In fact, there were indications that a burning temperature well above 1700°C would be required. As this is very unusual for lime kilns, Schaefer Kalk decided to perform a test run in the semi-industrial single shaft kiln plant designed by Maerz/RCE, located in Radenthein, Austria.

The trial went well and therefore Schaefer Kalk placed an order in 2016 for a turnkey installation of a 100 ton per day single shaft Maerz HPS kiln in its Kuala Ketil plant.

The kiln is keeping its promises: it produces lime with a residual CO₂-content well below 0.2% at a burning temperature of 1750°C, using natural gas as fuel. This is the highest burning temperature in a lime kiln Maerz has ever built!

This new single shaft kiln allows Schaefer Kalk to round off its product portfolio ensuring and further extending its position as one of the leading lime producers in Malaysia ■



HOW IS LIME PRODUCTION IMPACTED BY DIGITALISATION?

This paper was presented by Maerz at the International Lime Association Information Exchange Forum in Cape Town, October 2018, and also published in Zement Kalk Gips 3/2019.

INTRODUCTION

Digitalisation has become a buzzword in the industry. The permanent availability of abundant data on virtually any device is part of our daily life.

But what is it good for? What benefits can be drawn from all these data?

The heart of a lime plant is and always will be the kiln. Its design and its smooth operation lay the foundation for success. All measures taken by the lime kiln operator, including the decision to have a data collection system, must therefore be evaluated by answering the following three simple questions:

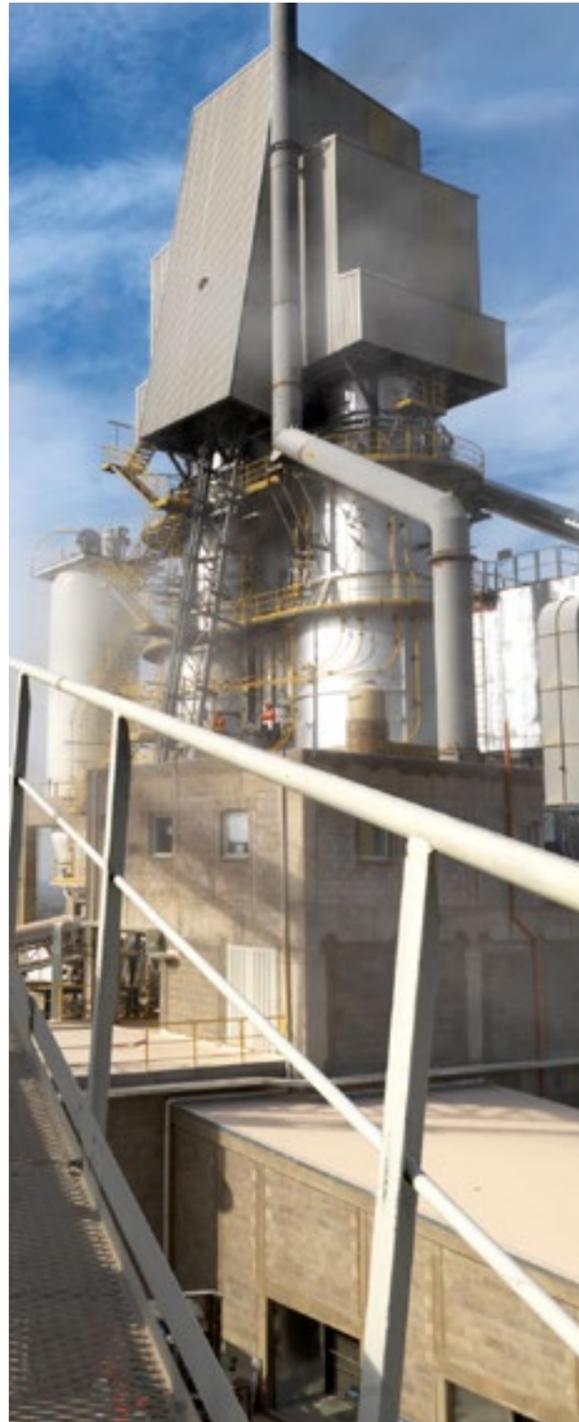
- Does the envisaged measure improve productivity?
- Does the measure improve quality?
- Is a measure beneficial to production costs?

Simply said: do we come closer to best practice when installing system x or y?

Data collection systems today most often emphasise maintenance only. They rarely include data which is not available online. This is, however, absolutely mandatory in order to gain the full picture and make the right decisions.

A SIMPLE CASE: BENCHMARKING REFRACTOR CONSUMPTION

Refractory repairs are one of the largest regularly occurring expenses during a lime kiln's lifetime. The performance of the refractory lining therefore has a significant impact on the overall production costs.



The 300/400 tpd Maerz Finelime® kiln at CEFAS, Argentina

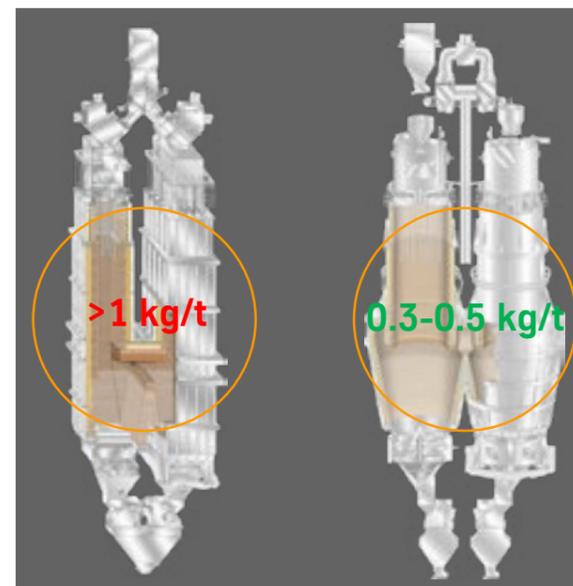
It looks as expensive as it is: refractory repair.



Data monitoring in these cases is fairly simple and is already implemented in every lime plant:

Take the quantity of lime produced during a certain period and oppose it to the weight of new refractories installed during that same period. This gives you a very good KPI: refractory consumption in kg/t of product.

We use this calculation to verify our design and to obtain interesting feedback from our customers. Some of our customers implemented this benchmark for quite a number of kilns which lends statistical significance to the findings. The customers compared the refractory life of rectangular Maerz kilns with a direct crossover channel to circular Maerz kilns with a suspended cylinder.



Specific refractory consumption of various PFR kiln types

The figures obtained confirm our design: whereas the direct crossover channel kiln uses more than 1 kg refractories per ton of lime in average, the suspended cylinder design results in the very low consumption figure of 0.3 – 0.5 kg per ton.

Design approved. Money saved.



DEALING WITH COMPLEX DATA

What if you have access to a huge quantity of complex data available at your fingertips?

Maerz believes in the philosophy of not “reinventing the wheel.” Hence we promote well-proven and readily available software based on industrial standards. This gives you as the customer the full flexibility you need in daily business and also provides enough extensibility to incorporate other parts of your lime plant.

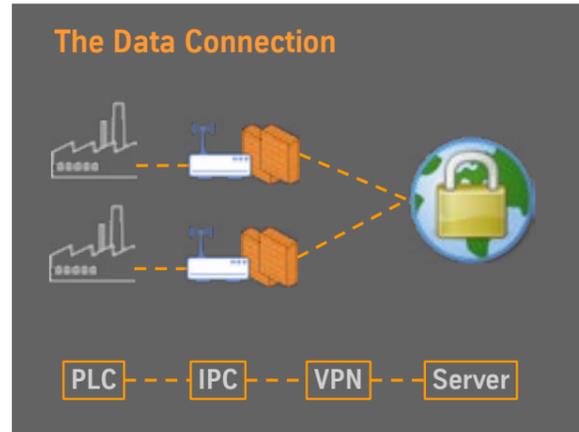
Only by following this philosophy may you be sure to be supported by a large community updating and bug-fixing software within the shortest possible time.



THE MAERZ MONITORING SYSTEM

We decided to follow the industrial communication standard “Open Platform Communication” developed by the OPC foundation, which is widely approved in the industry by major players such as Siemens, Rockwell, Modicon and many others.

The data are acquired from your PLC by an IPC, which transfers them through a firewall via VPN to a cloud server. The system’s architecture is designed in such way, that several plants in different locations can report to one server, so that a comparison of data from various locations and therefore benchmarking can easily be performed.



Data acquisition of the Maerz Monitoring System

Under the hood we rely on the German software Acron by Videc for data collection and as a database tool, which is controlled by the web application June5, also by Videc, for visualisation and interaction.

Acron features an excellent reporting tool, which allows compiling the data you would like to see even without programming knowledge. It further provides a sophisticated archiving function permitting the access to highly compressed historic data and comparison with online data – just in case you would like to do some benchmarking.

Acron also provides data summaries in any given time span to generate daily, weekly, monthly or yearly reports.

Complementing these advantages, June5 emphasises detailed administrative options, which allow an unparalleled user management: your administrator may define which user has access to which data, so that you may easily provide customised information relevant to a lime plant’s typical user groups: operating staff, maintenance teams, sales teams and also the management.

Everything is accessible via a web application – on any device. You may read the data and interact with your kiln from almost anywhere. And, of course, you may enter off-line data such as laboratory results and other important information you would like to correlate with the kiln process.

WHAT ABOUT DATA SECURITY?

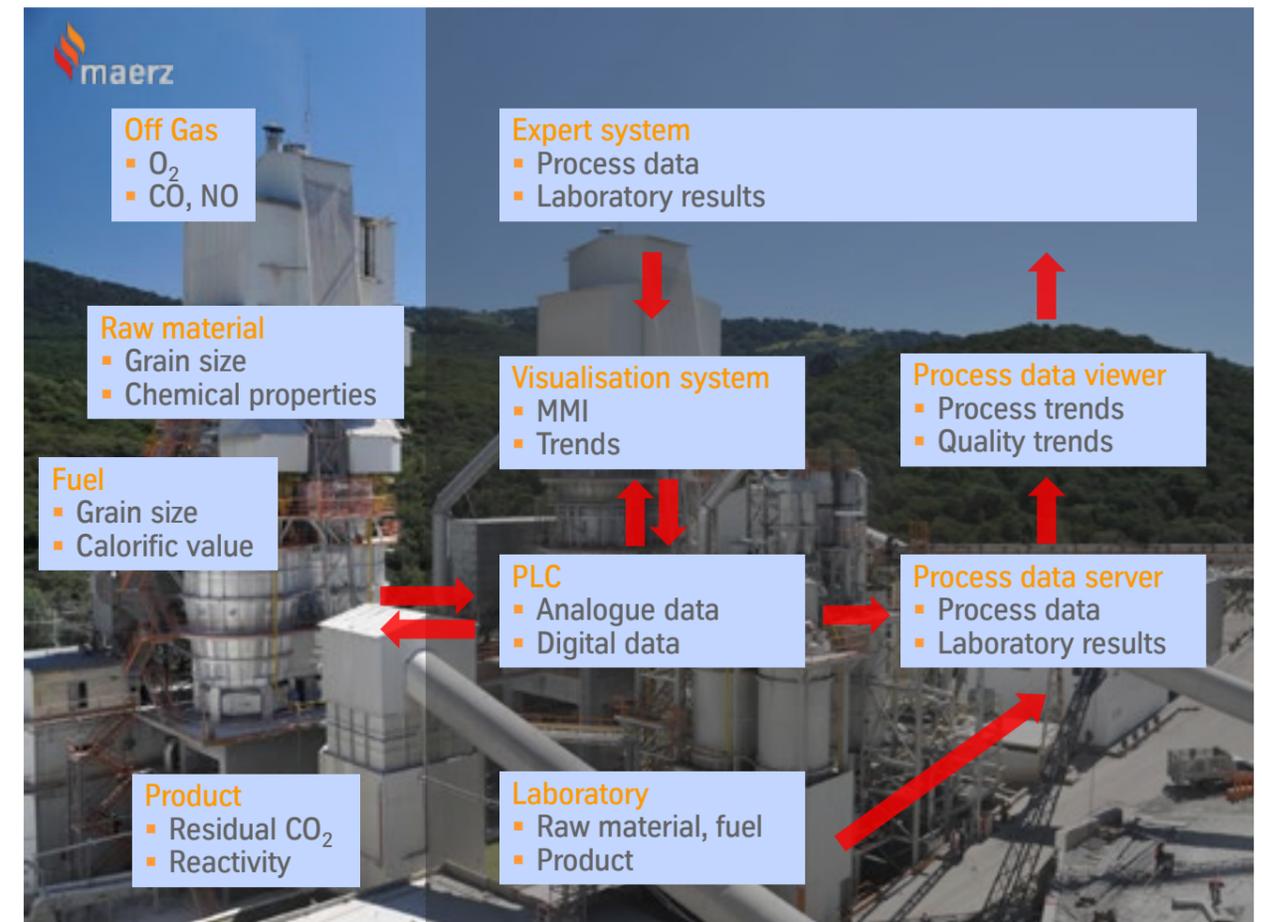
Here Maerz follows a clear strategy: your data belong to you. Your administrators have full control over any access to your data. You may, of course, share your data temporarily with Maerz to facilitate remote support.



WHERE DO WE GO FROM HERE?

It is obvious that a data monitoring system can only support the production process, but never replace a well-designed kiln and lime plant. The new and enhanced data processing tools allow us to better understand and control the lime burning process. For the time being the systems are designed to give only a feedback to the kiln operators.

In a next step the monitoring system may propose operating set points, thereby limiting the “human factor”, which may lead to fluctuations in the kiln process possibly generating unnecessary costs for fuel and electricity. In the not too distant future, a fully automated kiln operation is well imaginable: data collected online from the PLC in combination with data collected off-line from laboratories and other sources may be the foundation for an expert system, which operates the kiln based on the best practice available in the industry ■



SELECTION OF RECENT ORDERS

MCS MINING INDUSTRY LAOS CO., LTD., LAOS

MCS Mining Industry Laos Co., Ltd., domiciled in Pin Village, Thekhek District, Kham Muan Province, Laos, placed an order with Maerz Ofenbau AG for the supply of engineering, license, know-how, equipment as well as technical assistance services during commissioning and start-up of a Maerz PFR lime shaft kiln. The new kiln of the rectangular type E5 will calcine limestone with gradings of 40 to 80 mm and 50 to 100 mm resp. and will produce more than 300 tons of lime per day. Coal dust will be used as fuel, with an option to also use petcoke dust.

Maerz's equipment supply comprises the following main items:

- Process air blowers with motors
- Electric, measuring and control system
- Firing system for coal dust, including the start-up burner system
- Hydraulic equipment
- Limestone skip hoist winch, including the electrical measuring and control equipment

The contract signed by the client and Maerz also contains an option for the construction of another identical Maerz PFR lime kiln.

GANGYUAN CO. DOO SMEDEREVO, SERBIA

Gangyuan Co. Doo Smederevo, Serbia, placed an order with Maerz Ofenbau AG for the supply of engineering, license, know-how, equipment as well as technical assistance services during erection, commissioning and start-up of a Maerz PFR lime shaft kiln at the client's Kucevo lime plant. The new kiln of the circular type R4P will process limestone with a grading of 60 to 110 mm and will produce 600 tons of burnt lime per day.

Natural gas will be used as fuel, with an option to also use coal in the future. The kiln will eventually be operated with either 100 % natural gas, 100 % coal dust or a mixture of both fuels.

Maerz's equipment supply comprises the following main items:



The Kucevo lime plant

- Process air blowers with motors
- Electric, measuring and control system for the lime kiln
- Firing system for natural gas, including the start-up burner equipment
- Hydraulic equipment
- Limestone skip hoist winch, including the pertinent electrical measuring and control equipment

The client will perform the erection of the plant with local contractors and Maerz will act as technical advisor, if so requested by the client. Maerz's specialised technicians will assist with hot commissioning and acceptance test runs on the lime kiln and the associated equipment.

FASSA S.R.L., SPRESIANO, ITALY

Fassa S.r.l., domiciled in Spresiano (TV), Italy, and Maerz Ofenbau AG signed a contract for the supply of engineering, license, Knowhow and equipment for revamping the 400 tpd natural gas /wood fired MAERZ Lime Shaft Kiln built by Maerz some fifteen years ago at the client's Ceraino (VR) plant.

Within the contractual scope of equipment and services, Maerz will supply basic and detailed engineering as well as key equipment for the following kiln components:

- Limestone charging system
- Natural gas firing system
- Wood dust firing system
- Electric, measuring and control system



MCS' lime plant under construction

After revamping, the Maerz PFR Kiln of the rectangular type E6 will produce more than 350 tons of burnt lime or dolomite per day, processing limestone and dolomitic stone with grain sizes between 40 and 80 mm or similar, using natural gas and/or wood dust as fuels.

Furthermore, Fassa and Maerz signed a contract for the erection of another Maerz PFR kiln in Fassa's Ceraino di Dolcé (VR) lime plant.

The new Maerz PFR kiln of the circular type R1P with a nominal capacity of 300 tons of burnt lime per day will process limestone with gradings of 30 to 60 mm and 40 to 80 mm resp., using natural gas and wood dust as fuels. Firing with 100 % natural gas, 100 % wood dust and a mixture of both fuels will be possible.

Maerz's scope of supply for the new kiln plant includes engineering, license, knowhow, materials and equipment as well as technical assistance services. The material and equipment supply mainly comprises process air blowers with motors, firing systems for natural gas and wood dust, hydraulic system and the electric, measuring and control system.

Local contractors will carry out erection work for the plant under the supervision of the client. Commissioning and start-up of the kiln is scheduled for approx. 11 months from the effective date of the contract.

CHEMAMAN PUBLIC COMPANY LTD., THAILAND

Chememan Public Company Ltd., Thailand, operating several Maerz PFR and HPS Kilns for a number of years, and Maerz Ofenbau AG signed a contract for the construction of another Maerz HPS (High Performance Single Shaft) Kiln to be erected in Saraburi, Thailand. The new single shaft kiln of the H4-1D type will process limestone with a grading of 20 to 45 mm to produce more than 200 tons of burnt lime per day, using coal dust as fuel. The kiln is suitable to operate at approx. 60 % of its nominal capacity without a noticeable drop in lime quality.

According to the terms of the contract, Chememan will partly re-use Maerz engineering from HPS kiln No. 1. Maerz will provide know-how and license and will supply additional and updated engineering, material and equipment, as well as technical advice and assistance services during hot commissioning and the acceptance test run on the new lime kiln plant.

Maerz's scope of material supply includes the following main items:

- Steel structure for the kiln shaft
- Limestone charging and weighing system, including the skip winch
- Process air blowers with electric motors
- Coal firing system, including side burner equipment
- Hydraulic system
- Electric, measuring and control equipment for the lime kiln
- Lime discharge device
- Refractory materials (optional)

Erection of the plant will be performed with local contractors. Commissioning of the kiln plant and start of commercial quality lime production is scheduled for 8 to 10 months from the effective date of the contract.



Chememan's impressive "gallery" of Maerz kilns

SIRIMAN CHEMICALS, INDIA

SIRIMAN Chemicals India Private Limited, domiciled in Hyderabad, TG, India, placed an order with Maerz Ofenbau AG for the construction of a Maerz PFR lime shaft kiln to be installed at Visakhapatnam, Andhra Pradesh.

The new kiln of the rectangular type E2 will process limestone with gradings between 30 and 90 mm to produce 150 tons of burnt lime per day. Hard coal dust will be used as fuel.

Maerz will supply key equipment for the lime kiln, such as:

- Coal dust firing system
- Electric, measuring and control system
- Hydraulic equipment
- Limestone skip hoist winch, including the pertinent electrical measuring and control equipment.

SIRIMAN will perform the erection of the plant with local contractors and Maerz will act as technical advisor. The contract signed by the client and Maerz also contains an option for the construction of another identical Maerz PFR lime kiln.

OOO UKHTA CONSTRUCTION MATERIALS PLANT (UCMP) – UKHTA, RUSSIA

OOO Ukhta Construction Materials Plant (UCMP), domiciled in Ukhta, Komi Republic, Russia – the client – and Maerz Ofenbau AG signed a contract for the construction of a Maerz Lime Kiln. The location of the new lime production site will be Ukhta in the Komi Republic. The new kiln of the Finelime type F2S will process limestone with gradings of 40 to 80 mm and 15 to 40 mm resp. to produce between 350 and 400 tons of burnt lime per day. Natural gas will be used as fuel.

Maerz's scope of material supply includes the following main items:

- Key structural steel equipment
- Limestone weighing system
- Special refractories
- Process air blowers with electric motors
- Natural gas firing system
- Hydraulic system
- Electric, measuring and control equipment
- Stone charging equipment, including skip winch and electric control system
- Lime discharging equipment

UCMP will perform the erection of the plant with local contractors. Commissioning of the kiln plant and start of commercial quality lime production is scheduled for the end of 2020.

Furthermore, the contract UCMP/MAERZ provides options for the construction of two more Maerz kilns at the plant site in Ukhta.

TANGSHAN GANGYUAN METALLURGICAL AND FURNACE CO., LTD., LAOTING, P.R. CHINA

Tangshan Gangyuan Metallurgical and Furnace Co., Ltd., Laoting Branch, with its legal address in Hebei Laoting Economic Development Zone, as the "Buyer", placed an order with thyssenkrupp Industrial Solutions (China) Co., Ltd, domiciled in Shanghai, as the "Seller", for 5 Maerz PFR lime kilns to be installed in Laoting, Hebei Province.

The new lime kilns of the type R5S, each with a daily capacity of 800 tons of burnt lime, will be the biggest PFR Kilns built to date by Maerz Ofenbau AG, resulting in a total production of 4000 tons of lime per day. The kilns will be lean gas fired with the option to install an additional coal firing system in the future.

Within the scope of the contract, Maerz – in cooperation with thyssenkrupp Industrial Solutions (China) Co., Ltd., Shanghai, – will supply engineering, license, know-how as well as technical assistance services for erection, commissioning and start-up of the new lime kiln plant together with on-site training of the end-user's operating personnel.

Furthermore, the buyer has ordered the following key equipment for the lime kilns:

- Process air blowers
- Variable speed motors
- Lean gas heating equipment
- Option for coal heating system (future)
- Hydraulic system
- Electric, measuring and control equipment
- Limestone skip winch with pertinent electric, measuring and control system.

KALCIT LTD., BULGARIA

Kalcit Ltd., domiciled in Slivnitsa, Bulgaria, placed an order with Maerz Ofenbau AG for the supply of engineering, license, know-how, equipment as well as technical assistance services during erection, commissioning and start-up for a Maerz PFR lime shaft kiln. The new kiln of the rectangular type E2 with a nominal capacity of 100 tons of quicklime per day will process limestone with a grading of 40 to 80 mm. Natural gas will be used as fuel. All ancillary kiln equipment, such as the firing system, process air blowers, etc. will allow production rates between 75 and 150 tons of lime per day, with the quality of the lime produced meeting the contractual quality at all times.

Maerz's equipment supply comprises the following main items:

- Refractory materials for the kiln lining
- Process air blowers with motors
- Electric, measuring and control system
- Firing system for natural gas, including the start-up burner equipment
- Hydraulic equipment
- Limestone skip hoist winch, including the appertaining electrical measuring and control equipment
- Waste gas filter

Firing up the new H4 kiln in Chememan's lime plant

